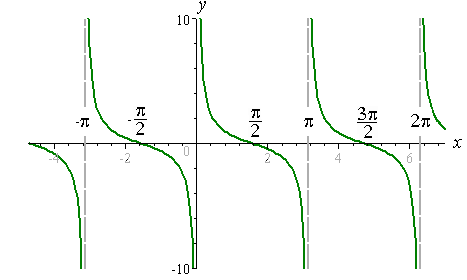
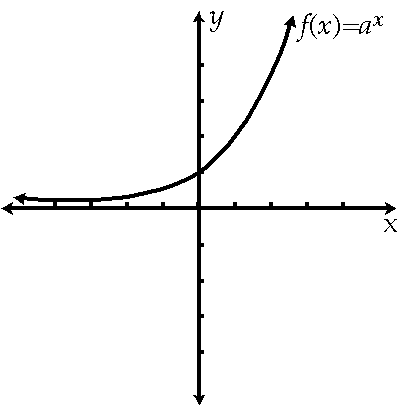
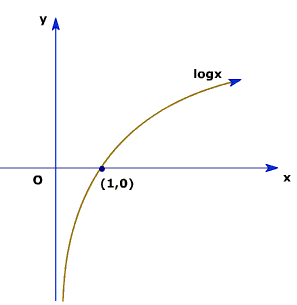
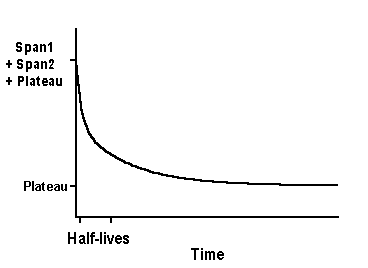
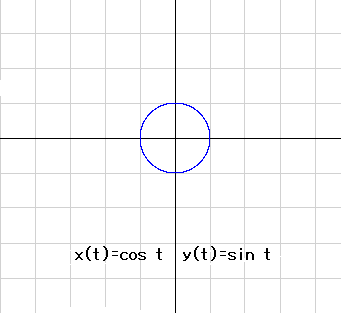
AP Calculus BC Outline Summary- Group #1

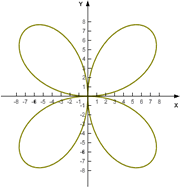
1. Functions, graphs, and Limits
   1. Analysis of Graphs
      1. Types of Functions
         1. Linear: No curves, straight line, 1st degree polynomial
         2. Quadratic: 2nd degree polynomial
         3. Trigonometric: A function using an angle as the variable
         4. Exponential: a function with the variable in the exponent
         5. Power: A function using a variable as the base with a constant exponent.
         6. Logarithmic: A function using logarithm as a form of the independent variable.
   2. Limits
      1. Definition: what happens as you get close to a point
      2. Intuitive understanding
         1. The behavior of the graph as the independent values approaches a limit.
      3. One-sided Limits
         1. is the limit from the right hand side
         2. is the limit from the left hand side
   3. Continuity
      1. Definition: An unbroken graph that contains no holes, no gaps, and usually no asymptotes.
      2. Continuity at a point: If and only if
         1. F(c) is defined
         2. exists
         3. = f(c)
   4. Asymptotes
      1. Definition: Line such that the distance between the curve and the line approaches zero as they tend to infinity (an x or y value as the graph approaches but never reaches as it approaches infinity)
      2. If the asymptote is horizontal, then the will be the x value of this horizontal line
      3. If the asymptote is vertical, then the =

**A. Parametric, Polar, and Vector Functions**

1. **Parametric Function**- A function with a parameter (i.e. t) that uses two different equations with respect to x and y to represent t, the variable. **Pg. 709**
   * 1. Graphing Process- input the same t value into both functions (x and y) and graph the outputs according to the x and y functions along the x and y axises. Continue this repeatedly and obtain a graph.

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1. **Polar Function**- A function using the distance from the center (r) and the angle of the point from the positive x axis (or 0 degrees/radians). **Pg. 729**
   * 1. Graphing Process- the variable of the function represents the angle from 0 radians (or the positive x axis) and the output represents the the distance from the origin.

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1. **Vector Function**- A function composed of a set of variables whose range is a set of multi-dimensional vectors. (sometimes resulting in a 3 or more dimensional shape). **Pg. 832**
   * 1. Graphing Process- A vector function is composed of more than one variable, set the first variable as a function of x and the other as a function of y, both with parameter of t. (If there are three or more variables, separate the original function into three or more pieces). Two pieces of a vector function will result in a plane curve that is two dimensional, three pieces will result in a space curve that is three dimensional.

**SAMPLE PROBLEMS- GROUP #1**

Limits:

1. http://archives.math.utk.edu/visual.calculus/1/limits.15/e1.gif
2. http://archives.math.utk.edu/visual.calculus/1/limits.15/e3.gif
3. http://archives.math.utk.edu/visual.calculus/1/limits.15/e7.gif
4. http://archives.math.utk.edu/visual.calculus/1/limits.15/e6.gif

1. What is the asymptote for this equation?



2. What is the asymptote for this equation?



3. What is the asymptote for this equation?



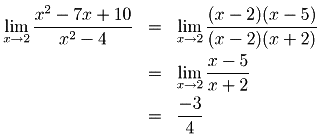
Continuity

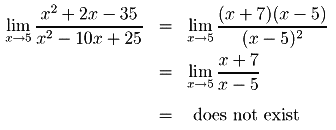
4. Is the graph continuous on the interval (2,6]

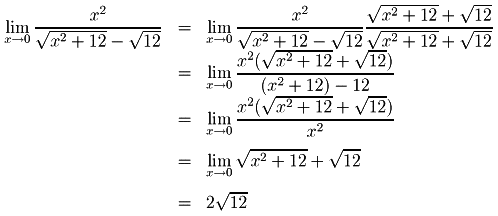


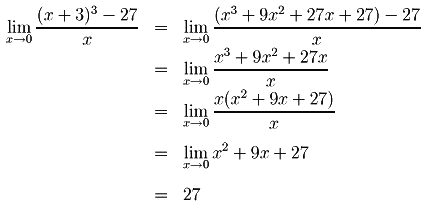
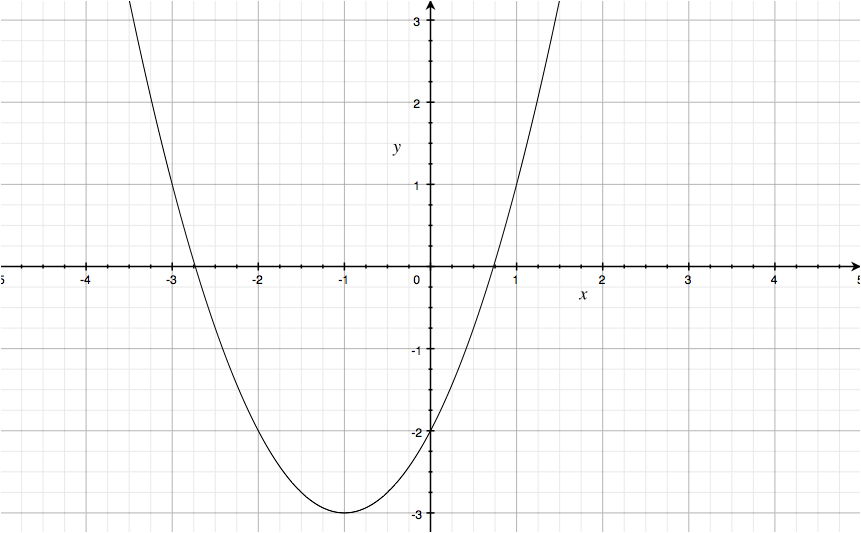
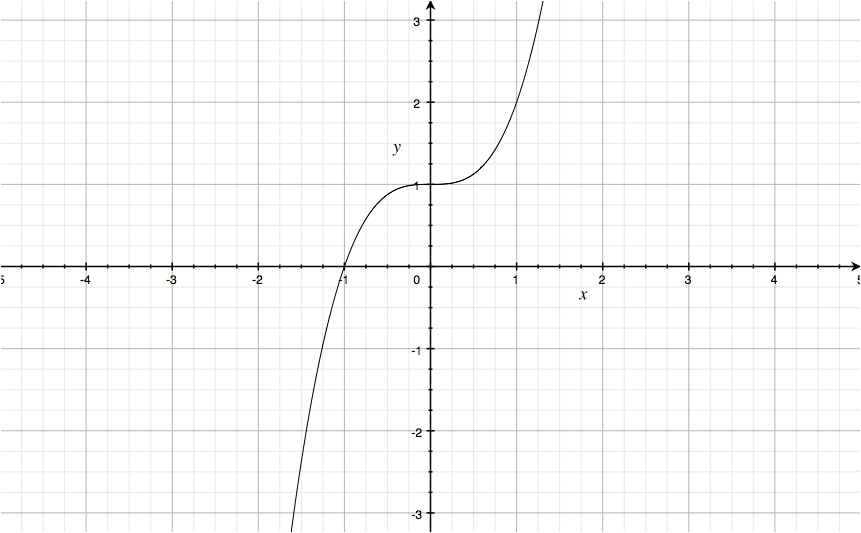
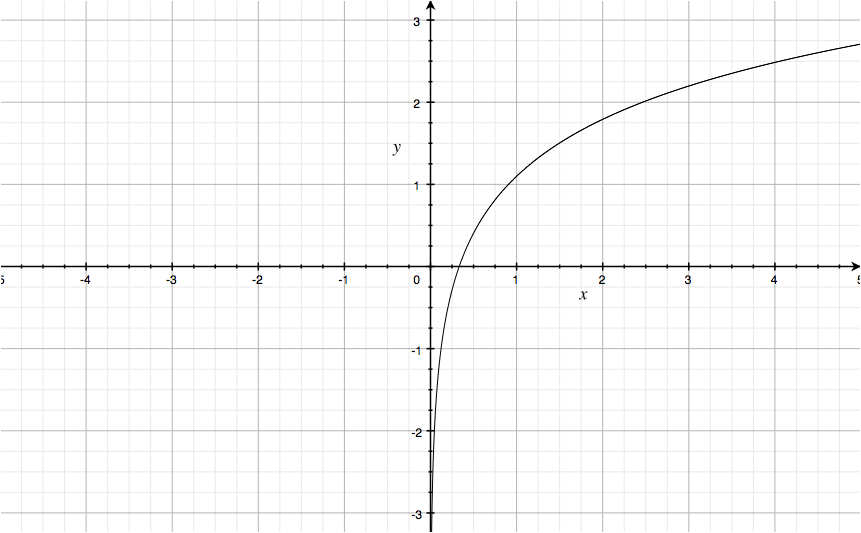
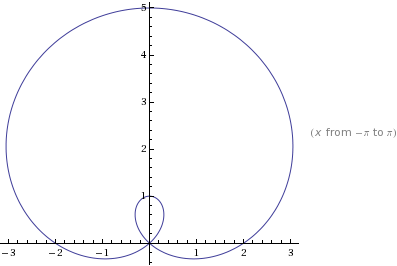
1. Analysis of Graphs
   1. Graph the function , where is the vertex? What are the x and y intercepts?
   2. Graph the function , where is the vertex of the graph? What are the x and y intercepts?
   3. Graph the function , what is the x intercept?
2. Parametric, polar, and vector functions
   1. Graph the polar function y=2+3sin(x)
   2. Graph the parametric function x=t-sin(t) and y=1-cos(t)

**Solutions**



1. 



1. 
2. y=3/4
3. None, the graph goes to infinity due to the greater degree in the exponent.
4. y=0 due to the greater power in the denominator, the graph will approach 0 as it goes to infinity.
5. No
6. Analysis of Graphs Answer Key
   1. 
      1. Graph the equation on your calculator or by using a t chart and inputting certain x values with y output values. Set y to 0 to find the y intercept, find the x intercept by setting x to 0.
   2. 
   3. 
7. Parametric, polar, and vector functions
   1. 
   2. 